

## CLAIMS

We claim:

1. An antenna for microwave radiation comprising a first horn, said first horn comprising a plurality of corrugations, at least one of said corrugations formed of a frequency selective surface (FSS) having a plurality of FSS elements coupled to at least one substrate.
2. The antenna according to claim 1, wherein said substrate has at least one of a relative permittivity and a relative permeability which is greater than 1.
3. The antenna according to claim 1, wherein said substrate defines a first propagation medium such that an RF signal having a first wavelength in said first propagation medium can pass through said FSS, wherein said FSS is coupled to a second propagation medium such that in said second propagation medium said RF signal has a second wavelength which is at least twice as long as a physical distance between centers of adjacent ones of said FSS elements.
4. The antenna of claim 3, wherein said second wavelength is different than said first wavelength.
5. The antenna of claim 3, wherein said FSS comprises at least one dielectric layer for matching an impedance of said first propagation medium to an impedance of said second propagation medium.
6. The antenna of claim 1, further comprising at least a second horn positioned within said first horn, said second horn comprising at least one FSS.
7. The antenna of claim 6, further comprising at least a third horn positioned within said second horn, said third horn comprising at least one FSS.
8. The antenna of claim 1, wherein said FSS comprises a plurality of dielectric layers.

9. The antenna of claim 1, wherein said FSS comprises a plurality of FSS element layers.
10. The antenna of claim 1, wherein said FSS elements comprise apertures in a conductive surface.
11. The antenna of claim 1, wherein said FSS elements comprise conductive elements.
12. An antenna for microwave radiation comprising:  
a first horn; and  
at least a second horn positioned within said first horn, said second horn comprising a plurality of corrugations, at least one of said corrugations formed of a frequency selective surface (FSS) having a plurality of FSS elements coupled to at least one substrate.
13. The antenna according to claim 12, wherein said substrate has at least one of a relative permittivity and a relative permeability which is greater than 1.
14. The antenna according to claim 12, wherein said substrate defines a first propagation medium such that an RF signal having a first wavelength in said first propagation medium can pass through said FSS, wherein said FSS is coupled to a second propagation medium such that in said second propagation medium said RF signal has a second wavelength which is at least twice as long as a physical distance between centers of adjacent ones of said FSS elements.
15. The antenna of claim 14, wherein said FSS comprises at least one dielectric layer for matching an impedance of said first propagation medium to an impedance of said second propagation medium.
16. The antenna of claim 14, wherein said second wavelength is different than said first wavelength.

17. The antenna of claim 12, further comprising at least a third horn positioned within said second horn, said third horn comprising at least one FSS.
18. The antenna of claim 12, wherein said FSS comprises a plurality of dielectric layers.
19. The antenna of claim 12, wherein said FSS comprises a plurality of FSS element layers.
20. The antenna of claim 12, wherein said FSS elements comprise apertures in a conductive surface.
21. The antenna of claim 12, wherein said FSS elements comprise conductive elements.